

Application No: 09/681,022

Applicants: Michael D. Sandoe & Michael G. Zimmer

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In the Claims:

1. (CANCELED)
2. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the thermoplastic fibers include polyester, polyolefins, and nylon.
3. (ORIGINAL) A laminate according to claim 2 wherein the polyester fibers include bicomponent fibers.
4. (ORIGINAL) A laminate according to claim 3 wherein the binder fibers have a denier in the range of 0.8-200.
5. (ORIGINAL) A laminate according to claim 4 wherein the binder fibers have a denier in the range of 6-25.
6. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the core layer batt has a basis weight in the range of 6-12 ounces/yd².
7. (ORIGINAL) A laminate according to claim 6 wherein the unmolded core layer batt has a thickness of 0.5-1.0 inches.
8. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the core layer batt has a basis weight of 6-24 ounces/yd².
9. (ORIGINAL) A laminate according to claim 8 wherein the unmolded core layer batt has a thickness of 0.5-2.0 inches.
10. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the binder fibers comprise bicomponent fibers.
11. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the binder fibers comprise low melting point fibers.
12. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the core layer batt comprises 35-45% by weight fine fibers having a denier of 0.8-1.2, 20-30% by weight fibers having a denier of 10-15, and the binder fibers comprise 30-40% by weight bicomponent fibers having a denier of 4-15.
13. (ORIGINAL) A laminate according to claim 12 wherein the core layer batt comprises about 40% by weight fine fibers having a denier of about 1.0, about 25% by weight regular fibers having a denier of about 15, and about 35% by weight bicomponent fibers having a denier of about 5.

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14. (PREVIOUSLY PRESENTED) A laminate according to claim 12, and further comprising a first and second web adhesive layer, the first web adhesive layer being disposed between the core layer and the first strengthening layer, and the second web adhesive being disposed between the core layer and the second strengthening layer, whereby the web adhesives enhance the bonding between the strengthening layers and the core layer.

15. (ORIGINAL) A laminate according to claim 14 wherein the web adhesive is a sheet of nonwoven polyester fibers.

16. (PREVIOUSLY PRESENTED) A laminate according to claim 65, and further comprising a first and second web adhesive layer, the first web adhesive layer being disposed between the core layer and the first strengthening layer, and the second web adhesive being disposed between the core layer and the second strengthening layer, whereby the web adhesives enhance the bonding between the strengthening layers and the core layer.

17. (ORIGINAL) A laminate according to claim 16, and further comprising a cover material bonded to the lower surface of the second strengthening layer.

18. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the strengthening layer batts comprise:

50-100% by weight polymeric fibers with a denier of 0.8-200, and

0-50% by weight binder materials.

19. (ORIGINAL) A laminate according to claim 18 wherein the binder materials are binder fibers.

20. (ORIGINAL) A laminate according to claim 18 wherein the polymeric fibers have a denier of 3-25.

21. (ORIGINAL) A laminate according to claim 20 wherein the strengthening layer batts have a basis weight of 3-24 ounces/yd².

22. (ORIGINAL) A laminate according to claim 21 wherein the unmolded strengthening layer batts have a thickness of 0.1-1.0 inches.

23. (PREVIOUSLY PRESENTED) A laminate according to claim 22 wherein the binder materials include a thermosetting resin.

24. (ORIGINAL) A laminate according to claim 23 wherein the thermosetting resin is a powder which is present in an amount up to 20% by weight in the strengthening layers.

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25. (PREVIOUSLY PRESENTED) A laminate according to claim 65, wherein the other fibers form the balance of the fibers in the core layer.
26. (PREVIOUSLY PRESENTED) A laminate according to claim 65, wherein the strengthening layers have a greater density than the core layer.
27. (ORIGINAL) A laminate according to claim 26, wherein the strengthening layers are thinner than the core layer.
28. (ORIGINAL) A laminate according to claim 27, wherein the core layer has a greater resistivity than the strengthening layers.
29. (PREVIOUSLY PRESENTED) A laminate according to claim 65, wherein each strengthening layer comprises less than 20% by weight fine fibers.
30. (PREVIOUSLY PRESENTED) A laminate according to claim 29, wherein the core layer comprises at least 25% by weight fine fibers.
31. (PREVIOUSLY PRESENTED) A laminate according to claim 65, wherein the percentage of fine fibers in each of the strengthening layers is not greater than half the percentage of fine fibers in the core layer and the fine fibers of each strengthening layer do not exceed 20% by weight.
32. (PREVIOUSLY PRESENTED) A laminate according to claim 65 wherein the denier of the core layer fine fibers is below 2.7.
33. (CANCELED)
34. (PREVIOUSLY PRESENTED) A headliner according to claim 66 wherein the thermoplastic fibers include polyester, polyolefins, and nylon.
35. (ORIGINAL) A headliner according to claim 34 wherein the polyester fibers include bicomponent fibers.
36. (ORIGINAL) A headliner according to claim 35 wherein the binder fibers have a denier in the range of 0.8-200.
37. (ORIGINAL) A headliner according to claim 36 wherein the binder fibers have a denier in the range of 6-25.
38. (ORIGINAL) A headliner according to claim 37 wherein the core layer batt has a basis weight of 6-12 ounces/yd².

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39. (ORIGINAL) A headliner according to claim 38 wherein the core layer batt has a molded thickness of 0.1-1.3 inches.

40. (ORIGINAL) A headliner according to claim 36 wherein the core layer batt has a basis weight of 6-24 ounces/yd².

41. (ORIGINAL) A headliner according to claim 40 wherein the core layer batt has an molded thickness of 0.1-1.5 inches.

42. (PREVIOUSLY PRESENTED) A headliner according to claim 66 wherein the binder material comprises a thermosetting resin.

43. (ORIGINAL) A headliner according to claim 42 wherein the thermosetting resin comprises up to 20% of the core layer.

44. (PREVIOUSLY PRESENTED) A headliner according to claim 66 wherein the core layer batt comprises 35-45% fine fibers having a denier of 0.8-1.2, 20-30% other fibers having a denier of 10-15, and the binder materials comprise 30-40% bicomponent fibers having a denier of 4-15.

45. (PREVIOUSLY PRESENTED) A headliner according to claim 44 wherein the core layer batt comprises about 40% fine fibers having a denier of about 1.0, about 25% other fibers having a denier of about 15, and about 35% bicomponent fibers having a denier of about 5.

46. (PREVIOUSLY PRESENTED) A headliner according to claim 45, and further comprising a first and second web adhesive layer, the first web adhesive layer being disposed between the core layer and the first strengthening layer, and the second web adhesive layer being disposed between the core layer and the second strengthening layer, whereby the web adhesives enhance the bonding between the strengthening layers and the core layer.

47. (ORIGINAL) A headliner according to claim 46 wherein the web adhesive is a sheet of nonwoven polyester fibers.

48. (ORIGINAL) A headliner according to claim 46 wherein the strengthening layer batts comprise:

50-100% by weight polymeric fibers with a denier of 0.8-200, and

0-50% by weight binder materials.

49. (PREVIOUSLY PRESENTED) The headliner according to claim 48, wherein the other fibers have a denier between 4-15.

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50. (ORIGINAL) The headliner according to claim 48, wherein the polymeric fibers have a denier of 3-25.

51. (ORIGINAL) The headliner according to claim 50, wherein the polymeric fibers are thermoplastic fibers.

52. (CANCELED)

53. (CANCELED)

54. (CANCELED)

55. (CANCELED)

56. (CANCELED)

57. (CANCELED)

58. (CANCELED)

59. (CANCELED)

60. (CANCELED)

61. (CURRENTLY AMENDED) The laminate according to claim ~~59~~67, wherein the strengthening layers are thinner than the core layer.

62. (CURRENTLY AMENDED) The laminate according to claim ~~59~~67, wherein each strengthening layer comprises less than 20% fine fibers.

63. (ORIGINAL) The laminate according to claim 62, wherein the core layer comprises at least 25% fine fibers.

64. (CURRENTLY AMENDED) The laminate according to claim ~~58~~67, wherein the percentage of fine fibers in each of the strengthening layers is not greater than half the percentage of fine fibers in the core layer and the fine fibers of each strengthening layer do not exceed 20%.

65. (CURRENTLY AMENDED) A laminate for use in making a thermoformed article, the laminate comprising:

first and second strengthening layers and a core layer disposed between the strengthening layers,

wherein the core layer comprises a batt of nonwoven thermoplastic fibers comprising:

20-50% by weight fine fibers with a denier in the range of 0.8-3.0;

10-50% by weight binder fibers for at least binding together the fine fibers; and

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other fibers having denier in the range of 4.0-15 denier; and
wherein the first and second strengthening layers comprise a batt of nonwoven polymeric
fibers comprising:

less by weight fine fibers ~~by weight~~ than in the core layer;

whereby the strengthening layers provide the predominant flexural rigidity for the
laminate and the core layer provides the predominant sound absorption for the laminate.

66. (CURRENTLY AMENDED) A headliner for a vehicle comprising:

first and second strengthening layers and a core layer disposed between the strengthening
layers,

wherein the core layer comprises a batt of nonwoven thermoplastic fibers comprising:

20-50% by weight fine fibers with a denier in the range of 0.8-3.0;

10-50% by weight binder fibers for at least binding together the fine fibers; and

wherein the first and second strengthening layers comprise a batt of nonwoven polymeric
fibers comprising:

less by weight fine fibers ~~by weight~~ than in the core layer;

whereby the strengthening layers provide the predominant flexural rigidity for the
headliner and the core layer provides the predominant sound absorption for the headliner.

67. (NEW) A laminate for use in making a thermoformed article, the laminate
comprising:

first and second strengthening layers and a core layer disposed between the strengthening
layers, with the strengthening layers providing the predominant flexural rigidity for the laminate
and the core layer providing the predominant sound absorption for the laminate;

the core layer comprises a batt of nonwoven thermoplastic fibers comprising:

20-50% fine fibers with a denier in the range of approximately 0.8-3.0 denier for
absorbing sound; and

10-50% binder fibers for at least binding together the fine fibers; and

the first and second strengthening layers comprise a batt of nonwoven polymeric fibers,
wherein the first and second strengthening layers have less by weight fine fibers than in the core

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layer and the core layer has a resistivity greater than at least one of the first and second strengthening layers.